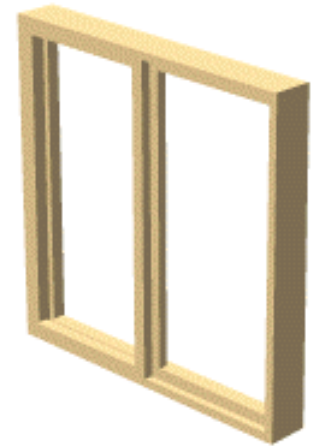


Improvements for Existing Homes - Windows



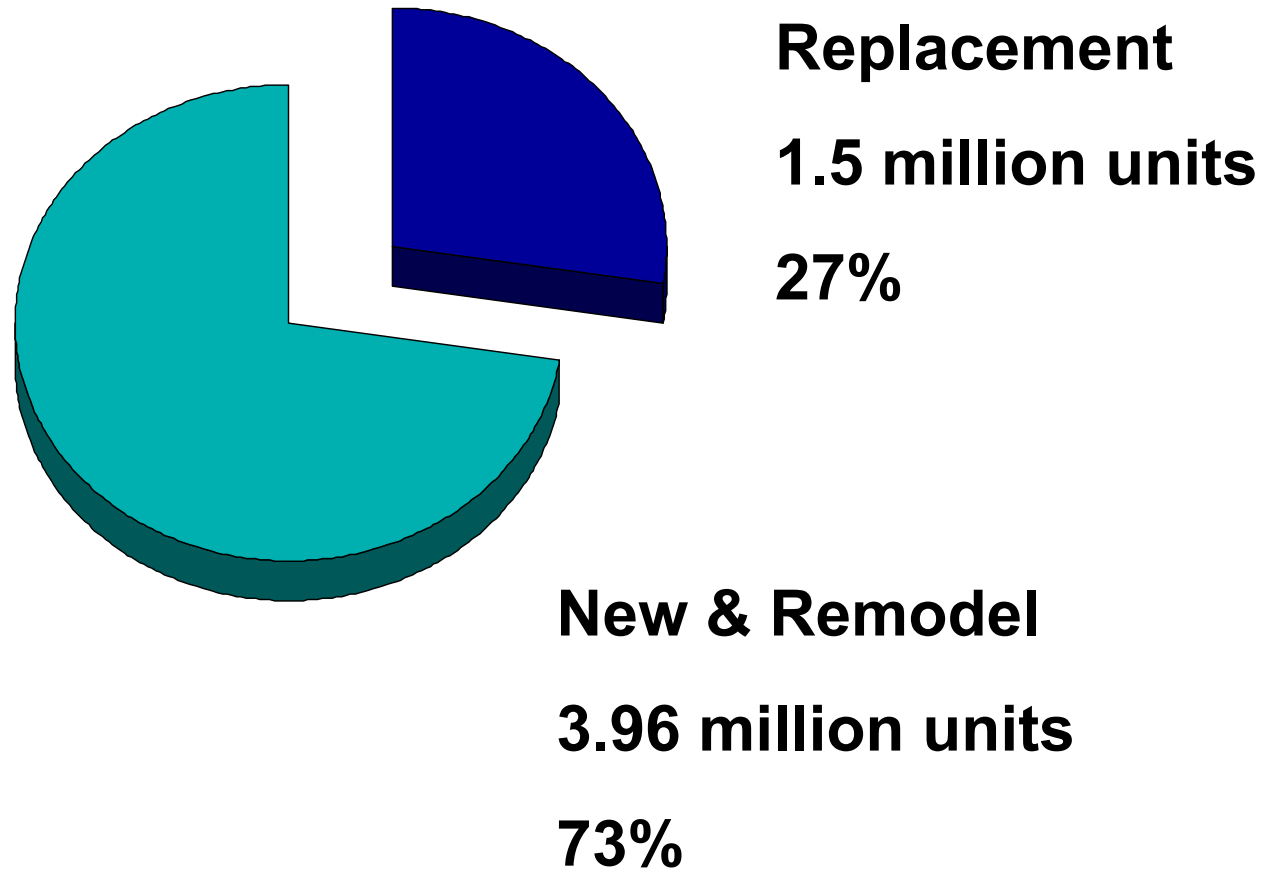
Statewide Codes & Standards Program
Prepared for CEC Workshop April 23, 2002
Presentation by PG&E/HMG/Enercomp, Inc.

Overview

- Replacement windows are provided an exemption under current standard
- Represents a significant energy and demand saving opportunity
- Added cost of using energy efficient replacement windows is life cycle cost effective



California Window Market



Replacement Market

- Homeowners replacing for a variety of factors beyond energy (broken, appearance, leaks, etc.)
- Added cost of getting energy efficient product is small compared to typical installed cost.
- Many replacement windows already efficient

Energy and Cost Impacts

- Energy savings of 16 therms and 324 kWh
- Costs between \$0 and \$1.50 per ft² for frames or glass
- Added costs between \$335 to \$670
- Net present value of energy savings \$895
- Added cost is life cycle cost effective

Proposed Changes

- A series of changes in §152(a) and §152(b), with a new definition in §101(b)
- As language for replacement fenestration evolved, it was clear that additional improvements could be made to additions and alterations



Proposed Changes

- Generally, the goal is to have all types of fenestration meet the same package requirements for area, U-factor and SHGC
- In cases where meeting the requirements is not desirable, the “existing plus alteration” performance trade-off approach can be used

Existing Definitions

- **ADDITION** is any change to a building that increases conditioned floor area and conditioned volume
- **ALTERATION** is any change to a building's water-heating system, space-conditioning system, lighting system, or envelope that is not an addition

Existing Definitions

- **REPAIR** is the reconstruction or renewal of any part of an existing building for the purpose of its maintenance...
- **MANUFACTURED FENESTRATION PRODUCT** is a fenestration product typically assembled before delivery to a job site...

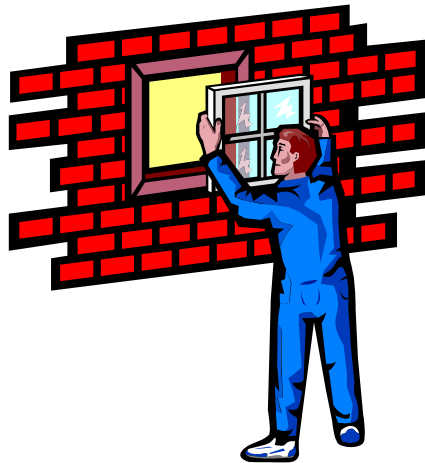
New Replacement Definition



- **REPLACEMENT FENESTRATION** is an alteration to the building envelope where all the glazing in an existing fenestration opening is replaced with a new manufactured fenestration product...

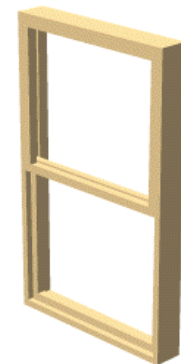
New Replacement Definition

- **...Note:** Glass replaced in an existing sash and frame, or replacement of a single sash in a multi-sash fenestration product are considered repairs.



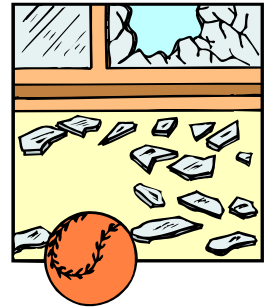
Covered as Replacement

- The frame, sash and glass is removed and replaced with a new window
- The sash and glass is removed and replaced with a new “retrofit” window
- Both sashes and glass are replaced in a double hung window



Not Covered as Replacement

- The glass is broken and replaced
- The sash and glass on the bottom half of a double hung is replaced
- An existing window is removed, and the opening is enlarged to install a sliding glass door (alterations)



Proposed Changes - Replacement

- Removes exemption and clarifies that replacement fenestration is an alteration
- Maintains exemption for repairs
- Requires that replacement products meet package values for U-factor and SHGC
- Clarifies that replacement products must be rated and labeled

Removing Exemption §152(b)2

- Note: Fenestration products repaired or replaced, not as part of an alteration, need not comply with the U-factor and Solar Heat Gain Coefficient requirements applicable to alterations.

Proposed Changes - Additions

- Requires that additions of any size meet package values for U-factor
- Package SHGC is already required

Proposed Changes - Alterations

- Requires that alterations meet package area limits
- Requires that alterations meet package values for U-factor
- Package SHGC is already required

Interaction with Other Changes

- Non-metal frames were shown to be cost effective in most climates during the AB970 revision
- As this language is written, if the package values for U-factor or SHGC change, the changes would apply to replacement fenestration as well

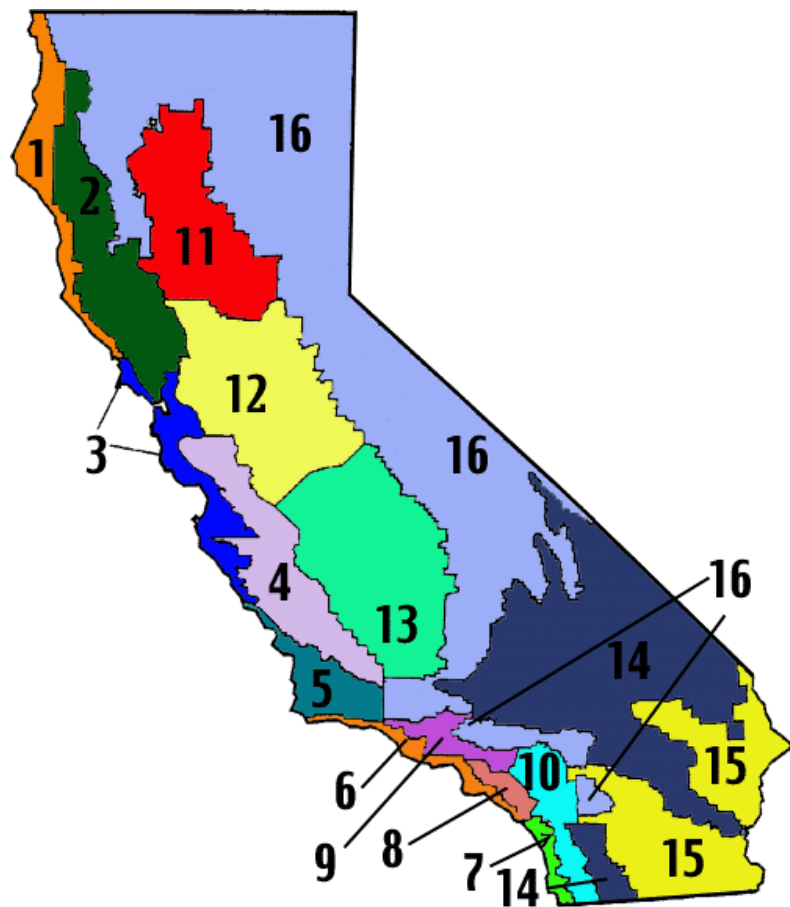
Package Requirements

■ Current

- U-factors 0.60 to 0.75
- SHGC 0.40 in cooling climates

■ 2005 (???)

- U-factors 0.40 to 0.55
- SHGC 0.35 in cooling climates



SHGC Alternatives §151(f)4

- Fenestration product; or
- Exterior shading device; or
- Combination of product and exterior device; or
- Optimal South overhang